



ring, wherein the ring forming two R's together represent a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

$R^9$  and  $R^{10}$  each are hydrogen or methyl,

each of  $R^{11}$  to  $R^{14}$  is hydrogen or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, a pair of  $R^{11}$  and  $R^{12}$ , a pair of  $R^{11}$  or  $R^{12}$  and  $R^{13}$ , a pair of  $R^{11}$  or  $R^{12}$  and  $R^{14}$ , or a pair of  $R^{13}$  and  $R^{14}$  may bond together to form a ring, wherein each pair represents a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

$R^{15}$  is hydrogen, methyl or  $CH_2CO_2R^{17}$ ,

$R^{15'}$  is hydrogen, methyl or  $CH_2CO_2R^{17'}$ ,

$R^{15''}$  is hydrogen, methyl or  $CH_2CO_2R^{17''}$ ,

$R^{15'''}$  is hydrogen, methyl or  $CH_2CO_2R^{17'''}$ ,

$R^{16}$  is hydrogen, methyl or  $CO_2R^{17}$ ,

$R^{16'}$  is hydrogen, methyl or  $CO_2R^{17'}$ ,

$R^{16''}$  is hydrogen, methyl or  $CO_2R^{17''}$ ,

$R^{16'''}$  is hydrogen, methyl or  $CO_2R^{17'''}$ ,

$R^{17}$ ,  $R^{17'}$ ,  $R^{17''}$  and  $R^{17'''}$  may be identical or different between  $R^{15}$  and  $R^{16}$ , between  $R^{15'}$  and  $R^{16'}$ , between  $R^{15''}$  and  $R^{16''}$  and between  $R^{15'''}$  and  $R^{16'''}$ , respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

$R^{18}$  is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

$R^{19}$  is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

$R^{20}$  is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

$R^{21}$  is an acid labile group,

k is 0 or 1,

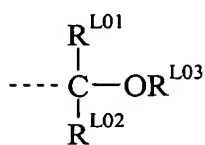
$x_1$ ,  $x_2$ ,  $x_3$ , a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying  $x_1+x_2+x_3+a+b+c+d = 1$ ,  $x_1$ ,  $x_2$ ,  $x_3$ , a, b and c are numbers inclusive of 0, d is a number of more than 0, ~~all of  $x_1$ ,  $x_2$  and  $x_3$  are not equal to 0 at the same time~~ provided that at least two of  $x_1$ ,  $x_2$  and  $x_3$  are not equal to 0.

2. (Canceled)

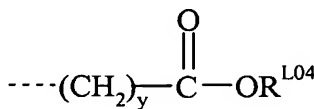
3. (Original) A resist composition comprising the polymer of claim 1.

4. (Original) A process for forming a resist pattern comprising the steps of:  
applying the resist composition of claim 3 onto a substrate to form a coating,  
heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and  
optionally heat treating the exposed coating and developing it with a developer.

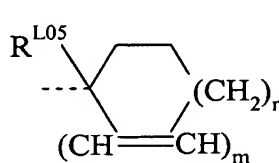
5. (New) The polymer of claim 1 wherein the acid labile group represented by  $R^{21}$  is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



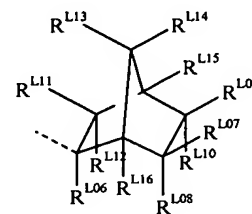
(L1)



(L2)



(L3)



(L4)

wherein the broken line denotes a free valence bond,  $\text{R}^{\text{L01}}$  and  $\text{R}^{\text{L02}}$  are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,  $\text{R}^{\text{L03}}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of  $\text{R}^{\text{L01}}$  and  $\text{R}^{\text{L02}}$ ,  $\text{R}^{\text{L01}}$  and  $\text{R}^{\text{L03}}$ , or  $\text{R}^{\text{L02}}$  and  $\text{R}^{\text{L03}}$  may form a ring, wherein each of  $\text{R}^{\text{L01}}$ ,  $\text{R}^{\text{L02}}$  and  $\text{R}^{\text{L03}}$  is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

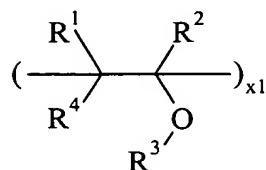
$\text{R}^{\text{L04}}$  is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

$\text{R}^{\text{L05}}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

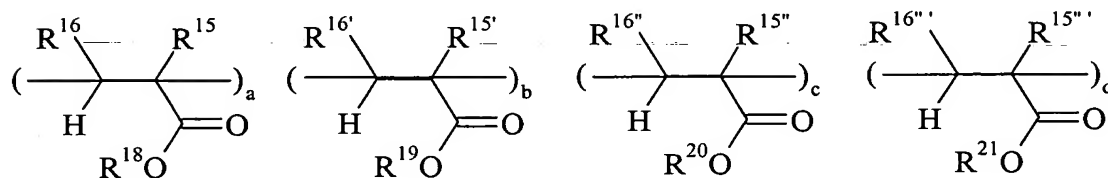
$\text{R}^{\text{L06}}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

$\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$  independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or  $\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$ , taken together, form a ring, wherein each of  $\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$  represents a divalent  $\text{C}_1\text{-C}_{15}$  hydrocarbon group which may contain a hetero atom, when they form a ring, or two of  $\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$  which are attached to adjoining carbon atoms may bond together directly to form a double bond.

6. (New) A polymer comprising recurring units of the following general formula (1a) and having a weight average molecular weight of 1,000 to 500,000,



(1a)



wherein R<sup>1</sup> and R<sup>2</sup> each are hydrogen or methyl,

R<sup>3</sup> and R<sup>4</sup> each are hydrogen or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, and R<sup>3</sup> and R<sup>4</sup> may bond together to form a ring, wherein R<sup>3</sup> and R<sup>4</sup> together represent a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

R<sup>15</sup> is hydrogen, methyl or CH<sub>2</sub>CO<sub>2</sub>R<sup>17</sup>,

R<sup>15'</sup> is hydrogen, methyl or CH<sub>2</sub>CO<sub>2</sub>R<sup>17'</sup>,

R<sup>15''</sup> is hydrogen, methyl or CH<sub>2</sub>CO<sub>2</sub>R<sup>17''</sup>,

R<sup>15'''</sup> is hydrogen, methyl or CH<sub>2</sub>CO<sub>2</sub>R<sup>17'''</sup>,

R<sup>16</sup> is hydrogen, methyl or CO<sub>2</sub>R<sup>17</sup>,

R<sup>16'</sup> is hydrogen, methyl or CO<sub>2</sub>R<sup>17'</sup>,

R<sup>16''</sup> is hydrogen, methyl or CO<sub>2</sub>R<sup>17''</sup>,

R<sup>16'''</sup> is hydrogen, methyl or CO<sub>2</sub>R<sup>17'''</sup>,

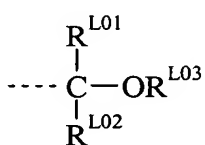
$R^{17}$ ,  $R^{17'}$  and  $R^{17''}$  may be identical or different between  $R^{15}$  and  $R^{16}$ , between  $R^{15'}$  and  $R^{16'}$ , between  $R^{15''}$  and  $R^{16''}$ , and between  $R^{15'''}$  and  $R^{16'''}$ , respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

$R^{18}$  is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

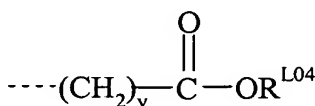
$R^{19}$  is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

$R^{20}$  is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

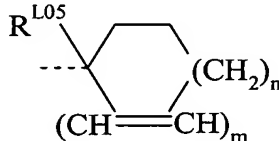
$R^{21}$  is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



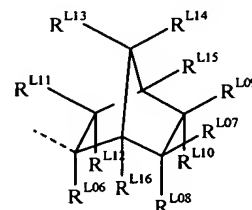
(L1)



(L2)



(L3)



(L4)

wherein the broken line denotes a free valence bond,  $R^{L01}$  and  $R^{L02}$  are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,  $R^{L03}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of  $R^{L01}$  and  $R^{L02}$ ,  $R^{L01}$  and  $R^{L03}$ , or  $R^{L02}$  and  $R^{L03}$  may form a ring, wherein each of  $R^{L01}$ ,  $R^{L02}$  and  $R^{L03}$  is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

$R^{L04}$  is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

$R^{L05}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

$R^{L06}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

$R^{L07}$  to  $R^{L16}$  independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or  $R^{L07}$  to  $R^{L16}$ , taken together, form a ring, wherein each of  $R^{L07}$  to  $R^{L16}$  represents a divalent  $C_1$ - $C_{15}$  hydrocarbon group which may contain a hetero atom, when they form a ring, or two of  $R^{L01}$  to  $R^{L16}$  which are attached to adjoining carbon atoms may bond together directly to form a double bond,

k is 0 or 1,

x1, a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying  $x1+a+b+c+d = 1$ , a, b and c are numbers inclusive of 0, d is a number of more than 0, x1 is not equal to 0.

7. (New) A resist composition comprising the polymer of claim 6.

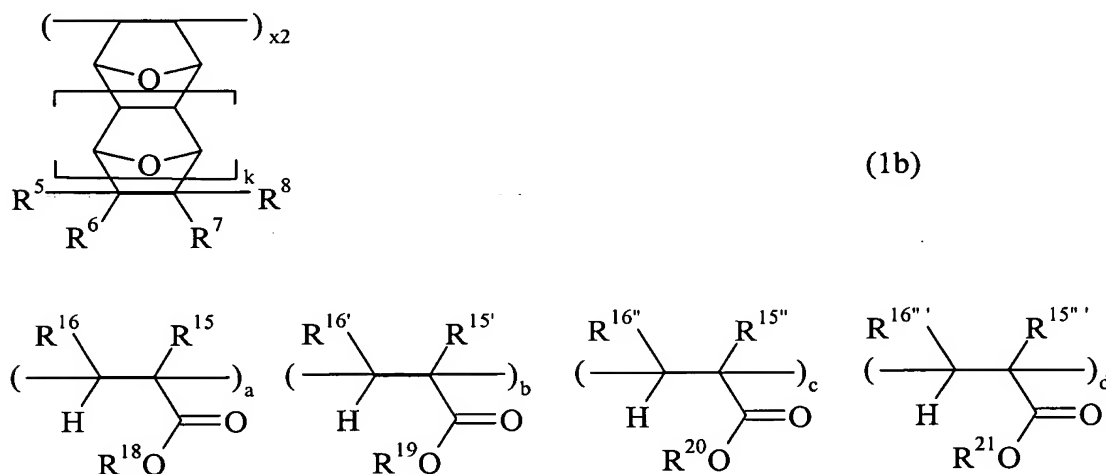
8. (New) A process for forming a resist pattern comprising the steps of:

applying the resist composition of claim 6 onto a substrate to form a coating,

heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and

optionally heat treating the exposed coating and developing it with a developer.

9. (New) A polymer comprising recurring units of the following general formula (1b) and having a weight average molecular weight of 1,000 to 500,000,



wherein each of  $R^5$  to  $R^8$  is hydrogen, a hydroxyl group or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, at least one of  $R^5$  to  $R^8$  contains a hetero atom, any two of  $R^5$  to  $R^8$  may bond together to form a ring, wherein the ring-forming two R's together represent a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

$R^{15}$  is hydrogen, methyl or  $\text{CH}_2\text{CO}_2R^{17}$ ,

$R^{15'}$  is hydrogen, methyl or  $\text{CH}_2\text{CO}_2R^{17}$ ,

$R^{15'}$  is hydrogen, methyl or  $\text{CH}_2\text{CO}_2R^{17''}$ ,

$R^{15''}$  is hydrogen, methyl or  $\text{CH}_2\text{CO}_2R^{17''}$ ,

$R^{16}$  is hydrogen, methyl or  $\text{CO}_2R^{17}$ ,

$R^{16'}$  is hydrogen, methyl or  $\text{CO}_2R^{17'}$ ,

$R^{16''}$  is hydrogen, methyl or  $\text{CO}_2R^{17''}$ ,



$R^{16''}$  is hydrogen, methyl or  $CO_2R^{17''}$ ,

$R^{17}$ ,  $R^{17'}$ ,  $R^{17''}$  and  $R^{17'''}$  may be identical or different between  $R^{15}$  and  $R^{16}$ , between  $R^{15'}$  and  $R^{16'}$ , between  $R^{15''}$  and  $R^{16''}$ , and between  $R^{15'''}$  and  $R^{16'''}$ , respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

$R^{18}$  is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

$R^{19}$  is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

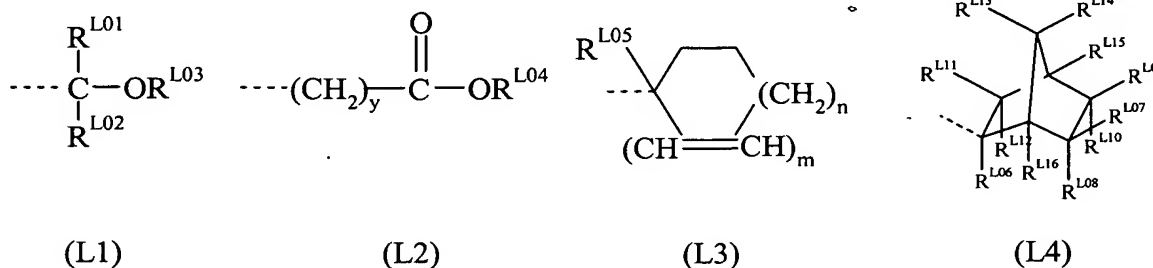
$R^{20}$  is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

$R^{21}$  is an acid labile group,

k is 0 or 1,

x2, a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying  $x2+a+b+c+d = 1$ , a, b and c are numbers inclusive of 0, d is a number of more than 0, x2 is not equal to 0.

10. (New) The polymer of claim 9 wherein the acid labile group represented by  $R^{21}$  is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



wherein the broken line denotes a free valence bond,  $R^{L01}$  and  $R^{L02}$  are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,  $R^{L03}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of  $R^{L01}$  and  $R^{L02}$ ,  $R^{L01}$  and  $R^{L03}$ , or  $R^{L02}$  and  $R^{L03}$  may form a ring, wherein each of  $R^{L01}$ ,  $R^{L02}$  and  $R^{L03}$  is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

$R^{L04}$  is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

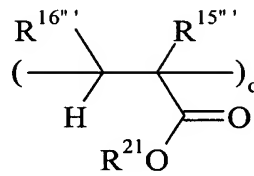
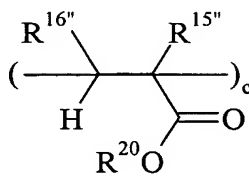
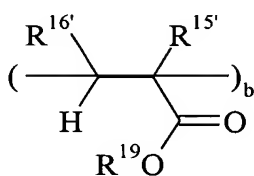
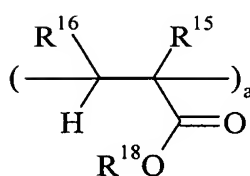
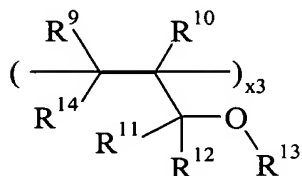
$R^{L05}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

$R^{L06}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

$R^{L07}$  to  $R^{L16}$  independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or  $R^{L07}$  to  $R^{L16}$ , taken together, form a ring,

wherein each of  $R^{L07}$  to  $R^{L16}$  represents a divalent  $C_1$ - $C_{15}$  hydrocarbon group which may contain a hetero atom, when they form a ring, or two of  $R^{L07}$  to  $R^{L16}$  which are attached to adjoining carbon atoms may bond together directly to form a double bond.

11. (New) A resist composition comprising the polymer of claim 9.
12. (New) A process for forming a resist pattern comprising the steps of:  
 applying the resist composition of claim 9 onto a substrate to form a coating,  
 heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and  
 optionally heat treating the exposed coating and developing it with a developer.
13. (New) A polymer comprising recurring units of the following general formula (1c) and having a weight average molecular weight of 1,000 to 500,000,



wherein  $\text{R}^9$  and  $\text{R}^{10}$  each are hydrogen or methyl,

each of  $\text{R}^{11}$  to  $\text{R}^{14}$  is hydrogen or a straight, branched or cyclic, monovalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom, a pair of  $\text{R}^{11}$  and  $\text{R}^{12}$ , a pair of  $\text{R}^{11}$  or  $\text{R}^{12}$  and  $\text{R}^{13}$ , a pair of  $\text{R}^{11}$  or  $\text{R}^{12}$  and  $\text{R}^{14}$ , or a pair of  $\text{R}^{13}$  and  $\text{R}^{14}$  may bond together to form a ring, wherein each pair represents a straight, branched or cyclic, divalent hydrocarbon group of 1 to 15 carbon atoms which may contain a hetero atom,

$R^{15}$  is hydrogen, methyl or  $CH_2CO_2R^{17}$ ,

$R^{15'}$  is hydrogen, methyl or  $CH_2CO_2R^{17'}$ ,

$R^{15''}$  is hydrogen, methyl or  $CH_2CO_2R^{17''}$ ,

$R^{15'''}$  is hydrogen, methyl or  $CH_2CO_2R^{17'''}$ ,

$R^{16}$  is hydrogen, methyl or  $CO_2R^{17}$ ,

$R^{16'}$  is hydrogen, methyl or  $CO_2R^{17'}$ ,

$R^{16''}$  is hydrogen, methyl or  $CO_2R^{17''}$ ,

$R^{16'''}$  is hydrogen, methyl or  $CO_2R^{17'''}$ ,

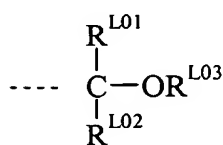
$R^{17}$ ,  $R^{17'}$ ,  $R^{17''}$  and  $R^{17'''}$  may be identical or different between  $R^{15}$  and  $R^{16}$ , between  $R^{15'}$  and  $R^{16'}$ , between  $R^{15''}$  and  $R^{16''}$ , and between  $R^{15'''}$  and  $R^{16'''}$ , respectively, and each is a straight, branched or cyclic alkyl group of 1 to 15 carbon atoms,

$R^{18}$  is hydrogen or a monovalent hydrocarbon group of 1 to 15 carbon atoms containing a carboxyl or hydroxyl group,

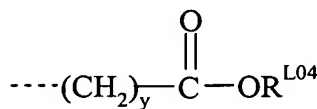
$R^{19}$  is a monovalent hydrocarbon group of 2 to 15 carbon atoms containing at least one partial structure selected from the group consisting of ether, aldehyde, ketone, ester, carbonate, acid anhydride, amide and imide,

$R^{20}$  is a polycyclic hydrocarbon group of 7 to 15 carbon atoms or an alkyl group containing a polycyclic hydrocarbon group,

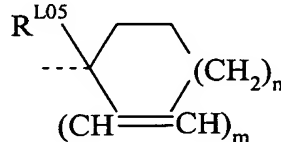
$R^{21}$  is an acid labile group selected from the group consisting of groups of the following general formulae (L1) to (L4):



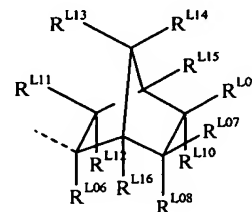
(L1)



(L2)



(L3)



(L4)

wherein the broken line denotes a free valence bond,  $\text{R}^{\text{L01}}$  and  $\text{R}^{\text{L02}}$  are hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,  $\text{R}^{\text{L03}}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms which may contain a hetero atom, a pair of  $\text{R}^{\text{L01}}$  and  $\text{R}^{\text{L02}}$ ,  $\text{R}^{\text{L01}}$  and  $\text{R}^{\text{L03}}$ , or  $\text{R}^{\text{L02}}$  and  $\text{R}^{\text{L03}}$  may form a ring, wherein each of  $\text{R}^{\text{L01}}$ ,  $\text{R}^{\text{L02}}$  and  $\text{R}^{\text{L03}}$  is a straight or branched alkylene group of 1 to 18 carbon atoms when they form a ring,

$\text{R}^{\text{L04}}$  is a tertiary alkyl group of 4 to 20 carbon atoms, a trialkylsilyl group in which each alkyl moiety has 1 to 6 carbon atoms, an oxoalkyl group of 4 to 20 carbon atoms, or a group of formula (L1),

$\text{R}^{\text{L05}}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms,

$\text{R}^{\text{L06}}$  is a monovalent hydrocarbon group of 1 to 8 carbon atoms which may contain a hetero atom or a substituted or unsubstituted aryl group of 6 to 20 carbon atoms, and

$\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$  independently represent hydrogen or monovalent hydrocarbon groups of 1 to 15 carbon atoms which may contain a hetero atom, or  $\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$ , taken together, form a ring, wherein each of  $\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$  represents a divalent  $\text{C}_1\text{-C}_{15}$  hydrocarbon group which may contain a hetero atom, when they form a ring, or two of  $\text{R}^{\text{L07}}$  to  $\text{R}^{\text{L16}}$  which are attached to adjoining carbon atoms may bond together directly to form a double bond,

$k$  is 0 or 1,

$x_3$ , a, b, c and d represent a molar compositional ratio of the recurring units associated therewith, satisfying  $x_3 + a + b + c + d = 1$ ,  $x_3$ , a, b and c are numbers inclusive of 0, d is a number of more than 0,  $x_3$  is not equal to 0.

14. (New) A resist composition comprising the polymer of claim 13.

15. (New) A process for forming a resist pattern comprising the steps of:

applying the resist composition of claim 13 onto a substrate to form a coating,  
heat treating the coating and then exposing it to high-energy radiation or electron beam through a photo mask, and  
optionally heat treating the exposed coating and developing it with a developer.